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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,680	02/13/2004	Nobuyuki Eto	Q79867	5870

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EXAMINER	
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1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/777,680	ETO ET AL.	
	Examiner	Art Unit	
	JASON L. LAZORCIK	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6 and 7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Preliminary Matters

Applicant notes in the reply filed May 1, 2008 (see page 6) that the Office Action dated November 1, 2007 mistakenly treated Applicants Request for Continued Examination (RCE) in the August 02, 2007 amendment as a request for continued prosecution application (CPA) under 37 CFR 1.53(d). With respect to this matter, the Examiner is in agreement with Applicants assertions and Applicant is advised that the noted RCE was inadvertently indicated as a CPA in the November 1, 2007 Office Action.

To confirm the current status of the case; a request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed on August 29, 2007 in this application after issuance of a final rejection on May 3, 2007. Since this application was eligible for continued examination under 37 CFR 1.114 at the time said RCE was filed, and since the fee set forth in 37 CFR 1.17(e) was timely paid, the finality of the previous Office action was withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 29 was entered and was treated as a Request for Continued Examination in the Official Action dated November 1, 2007.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Aratani (US 4,671,814).

Aratani teaches a method for strengthening a glass substrate having a thickness of about 1.0mm by chemical strengthening. As set forth in Example 1 (Column 8, Lines 39-53), the immediate reference teaches that,

> "The sample disks were immersed in a bath of molten sodium nitrate...The sample disks taken up from the bath were left to cool down and were washed with water to remove adherent sodium nitrate and dried.
>
> After the above treatment with sodium nitrate, all the sample disks were immersed in a bath of molten potassium nitrate....The samples taken up from the molten potassium were left to cool down, washed and dried."

The Aratani disclosure clearly sets forth a two step process wherein a glass substrate is process with a first alkali ion of a first molten salt containing sodium nitrate and followed with a subsequent treatment using a second alkali ion of a second molten salt containing potassium nitrate. Applicant is advised that the claimed effect upon compressive stress at the surface of the substrate and tensile stress at an interior depth of the substrate are understood implicitly to follow from the disclosed process.

With respect to the Examiners position on the residual stress profile set forth above, the Examiner offers the following rationale. Applicant is advised that the following discussion is offered solely to clarify the basis of the rejection set forth in the Office Action dated November 1, 2007. :

Applicant acknowledges that the Aratani process will increase the compressive stress at the surface of the glass sheet. Further with reference to Applicants presented figure 3, it is the Examiners position that the tensile stress through at a given depth of the glass sheet will be reduced in the manner claimed when the chemical strengthening is carried out according to the Aratani process.

That is, ion exchange and stress buildup in chemical tempering operations is well accepted to proceed in accordance with Fick's law of diffusion. According to Fick's law, the ionic concentration at a given depth increases as a function of time, and this increasing ionic concentration results in the noted increasing surface compressive stress. This increasing ionic concentration at a depth of the glass substrate likewise alters the stress profile at the depth, influencing the change over from compressive stress to tensile stress. In effect, the point at which the stress profile crosses over from compressive stress to tensile stress is pushed farther into the interior or the depth of the glass sheet with longer exposure to the molten ion exchange bath.

It follows that, since the Aratani second chemical strengthening step leads to an increased ion concentration at depth (by solid state diffusion) and thereby to an increased surface compressive stress, which was admitted by Applicant, this second

strengthening step necessarily pushes the stress cross over point deeper into the glass substrate. Since the crossover, representing the break even point between net compressive and net tensile stress, is pushed further into the depth of the glass substrate with temporal ionic diffusion, the tensile stress experienced at a given depth of glass is necessarily reduced and eventually placed into compressive stress as this cross over point passes said depth.

To summarize, the increasing surface compressive stress caused by ion diffusion into the glass substrate is accompanied by a crossover point which proceeds further into the depth of the substrate with increasing treatment time. Absent any compelling evidence to the contrary, it is the Examiners position that such a changing stress profile is inherently and necessarily accompanied by a reduction in the tensile stress of the depth of the glass substrate as claimed, when the chemical strengthening is carried out according to the Aratani disclosed process.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 6,119,483) in view of Aratani (US 4,671,814). Briefly, Takahashi teaches a method for processing a glass substrate for use as a magnetic disk.

With respect to Claims 1 and 2, Takahashi teaches that the glass substrate used for manufacturing a magnetic disk, after completion of grinding, polishing, and washing steps is subjected to a chemical reinforcement step. According to this process, " the glass substrate which had been washed was heated in advance to 300°C, and immersed for about 3 hours in a chemical reinforcement solution preliminarily heated to 400°C, said solution having been prepared by mixing potassium nitrate (60%) and sodium nitrate (40%)". Further, the reference indicates that "When the glass substrate is immersed in the chemical reinforcement solution, lithium ions and sodium ions on the surface layer of the glass substrate are substituted by sodium ions and potassium ions in the chemical reinforcement solution, respectively, whereby the glass substrate is reinforced" (Column 10, Lines 50-67).

The immediate disclosure is understood to provide a method for processing a glass substrate for a magnetic disk wherein the glass substrate contains alkali ions (lithium and sodium ions) on the surface layer of the glass substrate. The process using a first alkali ion (sodium) present as a molten salt of sodium nitrate and having a first ion radius greater than the smallest ion radius of the smallest alkali ion (lithium) among the

alkali ions contained in the glass substrate. The process further uses a second alkali ion (potassium) present as a molten salt of potassium nitrate for supplying the second alkali ion.

With respect to Claim 3, the immediate reference teaches that an aluminosilicate glass to be used for chemical reinforcement contains as principle components 57 to 74% SiO_2,...3 to 15% of Al_2O_3, 7 to 16% of Li_2O and 4 to 14% of Na_2O, each in terms of mole percent" (Column 9, Lines 25-31). The reference continues with a preferred example of ~67% SiO_2, ~1% ZnO_2, ~9%Al_2O_3, ~12%Li_2O and ~10%Na_2O, each in terms of mole %. The cited example composition for the aluminosilicate glass reads directly upon the claimed concentration ranges for each constituent.

With respect to Claim 6, Takahashi indicates that "the magnetic disk is produced by forming a thin film such as a magnetic layer on a substrate and as the substrate for it,...(a) glass substrate has been employed" (Column 1, Lines 21-23)

Takahashi teaches that the treatment process as indicated above proceeds by a single dip in a molten solution or mixture of potassium nitrate (60%) and sodium nitrate (40%). As such Takahashi fails to explicitly set forth a scenario wherein the processing of the glass substrate is effected by the use of a first ion alkali ion and ***subsequently*** processing the substrate by the use of a second alkali ion. It is here understood that the disclosed immersion in a molten mixture or solution of the two alkali ions does not anticipate the claimed process indicating a discrete first process step and a discrete ***subsequent*** second step.

Aratani teaches a method for strengthening a glass substrate having a thickness of about 1.0mm by chemical strengthening. As set forth in Example 1 (Column 8, Lines 39-53), the immediate reference teaches that,

> "The sample disks were immersed in a bath of molten sodium nitrate...The sample disks taken up from the bath were left to cool down and were washed with water to remove adherent sodium nitrate and dried.
>
> After the above treatment with sodium nitrate, all the sample disks were immersed in a bath of molten potassium nitrate....The samples taken up from the molten potassium were left to cool down, washed and dried."

The Aratani disclosure clearly sets forth a two step process wherein a glass substrate is process with a first alkali ion of a first molten salt containing sodium nitrate and followed with a subsequent treatment using a second alkali ion of a second molten salt containing potassium nitrate. Aratani teaches that thin float glass substrates tend to severely warp during chemical tempering or strengthening and that "the principle cause of such warping is presumed to be diffusion of tin, or an alternate metal, used as the molten metal in the float process into the glass surface which is in contact with the surface of the molten metal bath" (column 1, Lines61-68). The reference further indicates that the two step treatment "is remarkably effective for suppression of warping of float glass by ion exchange strengthening treatment" (Column 3, Lines 16-47). Since the Aratani process utilizes substantially the same materials in a substantially identical process, said two step process is implicitly understood to first "produce compression stress on a surface of the glass substrate and to produce tensile stress in a depth of the glass substrate" and second to "increase the compression stress of the surface of the glass substrate and to reduce the tensile stress of the depth of the glass substrate" as claimed.

It would have therefore been obvious to one of ordinary skill in the art at the time of the invention to modify the single mixture (60% potassium nitrate/40% sodium nitrate) chemical strengthening process set forth by Takahashi with the two step process as taught by Aratani. This modification would have been obvious to one of ordinary skill seeking to minimize the degree and severity of warping in a planar float glass substrate incurred during the chemically strengthening process.

Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 6,119,483) and Aratani (US 4,671,814) as applied to claim 1 above and in further view of Morehouse (US 5,379,171).

As set forth above, the collective prior art references teach every element of the Applicants parent claim 1. Specifically, Takahashi teaches that it is known to subject glass substrates of the claimed composition to a chemical strengthening operation when preparing a magnetic hard drive substrate. Aratani teaches that it is known to use Applicants claimed sequential, two-stage salt bath technique when chemically tempering a glass substrate in order to minimize deformation of the substrate. Takahashi teaches a specific embodiment wherein the glass disks have a thickness of 1.5 mm, and Aratani teaches substrates having a thickness of "about 1.0mm".

As indicated in the previous Office Action, it is the Examiners position, in light of the Takahashi and Aratani disclosures, that the use of a substrate with a thickness of "0.2 to 0.9mm" or "0.2 to 0.6mm" represents a merely trivial and obvious extension the prior art of record. Specifically, Takahashi teaches the use of glass substrates having a

thickness nearly equivalent to Applicants claimed thickness and Aratani teaches that the chemical tempering operation is applicable to substrates having a thickness of "about 1.0mm" thick. This point not withstanding, neither of the cited references explicitly teaches the use of a glass substrate within the claimed thickness ranges.

The United States patent to Morehouse et. al. teaches the detailed construction of a magnetic hard drive device. With respect to the disk substrate, Morehouse teaches that (Column 43, lines 35-47);

> "Magnetic recording disk 10 comprises a thin film surface, with coercivity greater than 1500 Oe, coated with materials such as Co--Ni or Co--Cr--Ta alloys, applied to both sides of a rigid substrate by methods such as RF sputtering or plating. The substrate used with magnetic recording disk 10 is preferably about 0.445 mm thick, with very flat, smooth, surfaces and with good mechanical rigidity. Examples of suitable substrate materials are aluminum alloys, glass and ceramic materials." (emphasis added)

As evidenced by the Morehouse reference, the use of a glass substrate having a thickness of 0.445mm which is in the range of 0.2 to 0.9 mm [Claim 4], or alternately from 0.2 to 0.6mm thick [Claim 6], is known in the art of hard drive manufacture. In view of the instant disclosure, the use of a substrate of the claimed thickness would be considered obvious to one of ordinary skill in the art at the time of the invention.

Response to Arguments

Applicant's arguments filed May 1, 2008 have been fully considered but they are not persuasive.

In response to the rejection of claims 1 and 2 in view of Aratani and of claims 1-3 and 6 under 35 U.S.C. §103(a) in view of Takahashi and Aratani, Applicant argues that none of the prior art references teaches the claimed increase of the compression stress of the surface of the glass substrate and to reduce the tensile stress of the depth of the glass substrate. In support of this allegation, Applicant presents reference figures 1 to 3 to compare the stress profile resulting from the claimed invention compared to that resulting from the treatment schedule set forth in the Aratani reference. Relying upon these figures, Applicant concludes that the Aratani process results in an increase in the compression stress of the surface of the glass substrate and that the tensile stress of the depth of the glass substrate is also increased.

Applicant's arguments on this matter are held to be unpersuasive for at least the following reasons.

1) First, Applicants presented evidence, namely figures 1 to 3, which are relied upon to show differences between the Aratani and Applicants inventions are not supported by the specification as originally filed, they are not supported by any stated scientific theory, nor are they supported by any empirical data on the record. In short, Applicants conclusory statements regarding the nature of the residual stress profile resulting from the two step chemical strengthening process detailed by Aratani stand as

unsubstantiated attorney allegation in the absence of any compelling evidence in support thereof. The identified figures 1 to 3 do not constitute convincing evidence on the record in support of Applicants' position and to the extent that Applicant has failed to provide evidence on the record in support of the stated position, it follows that said allegations are held to be mere conjecture and attorney argument.

The Official policy regarding Attorney argument is clearly outlined in MPEP §2145 [R-3];

> "Attorney argument is not evidence unless it is an admission, in which case, an examiner may use the admission in making a rejection. See MPEP § 2129 and § 2144.03 for a discussion of admissions as prior art. The arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); In re Geisler, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997) ("An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness."). See MPEP § 716.01(c) for examples of attorney statements which are not evidence and which must be supported by an appropriate affidavit or declaration.

2) Second, the Aratani reference was shown to teach every step of Applicants claimed invention including, *inter alia*, 1) chemically strengthening the glass substrate by the use of a first alkali ion having a first ion radius greater than a smallest ion radius of a smallest alkali ion among the alkali ions contained in the glass substrate so as to

produce compression stress on a surface of the glass substrate and to produce tensile stress in a depth of the glass substrate and 2) subsequently chemically strengthening the glass substrate by the use of a second alkali ion having a second ion radius greater than the first ion radius of the first alkali ion so as to increase the compression stress of the surface of the glass.

With respect to the nature of the increased surface compression stress, Applicant repeatedly acknowledges (see page 8, last paragraph; page 10, second paragraph) that such a result will necessarily flow from the Aratani disclosed process. Now regarding the nature of the tensile stress at the depth of the glass substrate, it is the Examiners position that that the Aratani disclosure teaches a process which is substantially identical to Applicants claimed process. It stands to reason that the product produced by the disclosed process would present physical properties, namely a residual stress profile, which are likewise substantially identical to that claimed by Applicant.

Although Applicant contests the Examiners position on this matter, Applicant has failed to present any convincing evidence to rebut the Examiners position. Since the prior art performs identical process steps, the burden of proof shifts to Applicant to show an unobvious difference between the product resulting from the prior art process that that claimed in the instant application. For further information, Applicant is pointed to MPEP §2112 which states in part that;

"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie

obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

3) Finally assuming, *arguendo*, that Applicants submitted figures 1 to 3 reflect the true nature both of Applicants residual stress profile as well as that resulting from the Aratani process, which position the Examiner does not concede, said figures actually support the Examiners finding of anticipation under 35 U.S.C. §102.

As noted in the grounds of rejection under 35 U.S.C. §102 above, the crossover point between net compressive stress and net tensile stress proceeds further into the glass substrate depths with increasing treatment time. As this crossover point passes a given depth, the tensile stress experienced at said depth is necessarily reduced, to the crossover point which displays a net zero tensile stress, and eventually into a state of compressive stress. It follows that the second chemical strengthening, which increases the ionic diffusion time, will necessarily lead to a reduced tensile stress at at least a given depth of the glass substrate.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. LAZORCIK whose telephone number is (571)272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLL

/Eric Hug/
Primary Examiner, Art Unit 1791

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/777,680	ETO ET AL.	
	Examiner	Art Unit	
	JASON L. LAZORCIK	1791	